lobe extending towards the speech and auditory centers. It is interesting to note in this case the recurrence of these inflammatory congestive symptoms on the advent of the secondary erysipelas affecting the scalp over the site of the epidural abscess. In the second case an attack imitating epilepsy occurred, evidently from intense cerebral congestion spreading from the zone of inflammation surrounding the epidural abscess. The congestion subsided and no further symptoms occurred for two weeks, when general meningitis suddenly developed. An interesting case of similar character is reported by MacEwen.* Vomiting, stupor, slow pulse, etc., are not symptoms of epidural abscess, but rather of intra-cerebral abscess and operation should not be deferred until such pronounced symptoms arise.

Treatment.—Success in the surgical treatment of an epidural abscess depends on the promptness of operation. Failure is too frequently due to the delay in waiting for supposedly definite localizing symptoms. We should remember that the surface of the brain usually affected by extension of infection from the middle ear or mastoid is that of the temporo-sphenoidal lobe or that of the cerebellum; the latter usually by way of the lateral sinus. The motor area is situated so far above the middle ear that it is folly to wait for localizing symptoms from this cortical area. Also, it should be remembered and strongly urged that an exploratory operation to uncover the dura adjacent to the mastoid and middle ear is fraught with little danger; by no means as dangerous as an exploratory laparotomy where the peritoneum is opened. The dura is tough, very resistent to infection and can be safely exposed without any danger to the brain itself. Therefore in cases where a purulent focus in the ear or mastoid exists or has recently existed, and symptoms suspicious of intra-cranial infection have arisen, the adjacent dura should be uncovered, preferably by way of the roof of the mastoid or middle ear. If the dura of the middle fossa is found to be normal, the dura of the posterior fossa should be uncovered by uncovering the sinus and the cerebellum below the sinus. When the epidural abscess is reached pus will escape from between the bony plate and the surface of the brain. There will not, as a rule, be a large amount of pus. The condition is that of a circumscribed pachymeningitis. The membranes are found to be thickened, flakey, and yellow or purplish with adherent granulations. The softened bony table should be removed until a decided improvement both in the appearance of the dura and the condition of the overlying bone is apparent. Soft, yellowish bone is evidently infected and should be removed. The feel from the use of the rongeur in removing the bone is a helpful guide. The form of dressing is immaterial, just so it is sterile. If a large epidural abscess is uncovered and therefore a large area of brain exposed, comfortably hot cloths should be frequently applied during the operation.

While an exploratory operation to uncover an epidural abscess is almost devoid of danger and should be done more frequently, exploratory incisions or punctures in the brain substance are by no means so harmless. Even if the symptoms have simulated an intra-cerebral abscess, as in the first case reported, the writer believes it is best on thoroughly uncovering the epidural abscess to refrain from puncturing the brain substance in the search for a deeper-seated collection of pus. This can be done at a later operation if pressure symptoms persist.

*Pyogenic Diseases of the Brain and Spinal Cord. MacEwen (p. 192).

MECHANICAL TREATMENT OF HIP JOINT DISEASE.

By JOSEPH KURTZ, M. D., Los Angeles.

There is one remedy for diseased or injured joints which is superior to anything else and that remedy is perfect rest, which can only be obtained by a well-adjusted apparatus. Orthopedic appliances have been used to correct deformities for hundreds, and, perhaps, thousands of years; our text-books speak well of many, and criticize others sharply. It was my good fortune to attend the section of orthopedic surgery at Washington about three years ago, and it amused me not a little to hear so many of the rising orthopedists crack up their latest in the line of apparatus. A great many such appliances are now in use for the hip and each one has its advocates, and I may say that each one, in the hands of a competent orthopedic surgeon, may accomplish good and even the best results.

Their effect is to secure absolute rest to the joint while, at the same time, they should not interfere with outdoor exercise or the comfort of the patient; they must immobilize the joint and relieve it of the body weight. Now, while there is such a large number of apparatus, all may be divided into two classes: 1st, such as provide immobilization only, and 2nd, such as combine fixation and traction.

The apparatus of the second class, the fixation and traction combination, is generally used in this country and known abroad as the American splint. Our foremost teachers of orthopedics insist on their use, saying that they are the only kind to obtain good results. Most of the English, German and French are satisfied with the first class, apparatus without the traction combination. No doubt the traction method is theoretically the ideal, the most effective method; if it really does its work well it should separate the joint surfaces so that they cannot possibly touch each other, but I doubt whether this is often accomplished. In my opinion, the majority of these appliances simply control the muscular contraction the same as the weight and pulley extension does in fractures; of course this, in itself, is of great importance and contributes greatly to the relief and comfort of the patient. Unfortunately, they require the use of adhesive straps to secure the traction and many of the younger pa-

tients bear them but poorly, they being often a source of annoyance. Furthermore, these splints are generally quite complicated, and also costly, so that it is questionable whether these defects do not outweigh the little additional security they seem to possess over the apparatus without traction. I am inclined to believe also that the majority of the American splints are not perfect fixation splints. It seems, however, that some orthopedists favor a little motion in the joints, as long as they feel convinced that the articulatory surfaces are kept apart, so no friction can take place. Now it has been proved beyond a doubt that fixation does not cause ankylosis and that if ankylosis occurs, and I dare say in the majority of cases it does occur, this is never due to the fixation apparatus, but to the character of the disease. Fixation will promote healing and prevent ankylosis, motion favors ankylosis.

Time is too short to give you a description of the various apparatus in use, so I must content myself to mention some of the best known and, finally, to recommend what I think will prove, if not the best, at least as good as any. Of the American class we find practically in every text-book on orthopedic surgery these well known splints: Taylor's, Judd's, Sayre's, Lovett's, Phelps' and also the Bradford frame. Every one of these has its good points and with each one you may accomplish your object.

Of the European, or purely fixation class, the following deserve recognition: Plaster of paris simply or with the stilt, as used by Lorenz, the Lorenz brace, the Hessing sheath apparatus and last, but not least, the Thomas fixation splint with its many modifications. L. Sayre, the father of modern orthopedics in this country, found himself compelled to use some cheap material in order to treat a case of Spondylitis; the patient could not afford the costly brace, so Sayre tied the plaster of paris jacket and, to his astonishment, he found it in fact the best of any apparatus used except for its stability and possible uncleanliness. Later on he used the same material for hip cases. I really believe that we owe to L. Sayre more for the introduction of the plaster of Paris dressing than for anything else he has done. Lorenz perfected the plaster of paris dressing very much; his spica, which reaches to about the middle of the leg, below the knee, may be used as such or in connection with a stilt below in order to remove body weight from the joint. Some surgeons apply the plaster of paris and then, in order to get a stilting apparatus, place a brace over this. To me this would not appeal.

I would not do justice to my paper if I did not mention the Hessing sheath splint (Hulsenschiene), although there may not be one in this country. Hessing is not a doctor of medicine nor a surgeon; he was originally a truss maker (a bandagist), and has perfected himself into a thorough orthopedist. He is frequently quoted by Hoffa, Lorenz and other German orthopedists and his apparatus is much used in Germany. It is much more complicated and much more expensive than any other and is not apt to find its way into this country. All his apparatus is made and molded over a perfect or corrected cast and is, in fact, as much a corset as the back brace or corset. I now come to the last, but not least, the Thomas or its modifications, and this is the one which I employ more than any other. I had an idea that I had a modification of it all for myself as I had it made to suit myself. I needed a splint for a poor patient and had it constructed on as cheap a scale as the case would permit; the result was so gratifying that I have used quite a large number of the same kind since. I expected to show it to you as Kurtz' own, but imagine my horror, Tuesday, when a child came to me with practically the same splint, which was applied by Dr. Gibney of the "Hospital for Crippled" in Brooklyn. The Thomas splint has been modified by Phelps, who added the ring, changed the upright to the inside and applied an extra outside short splint to it. Perhaps there is nothing more perfect than this, but I must again say that it is too complicated and too expensive, and I venture to say, also, that I can get as good results with my splint as were ever obtained with Phelps' modified Thomas splint.

The beginning of the treatment of a tubercular hip case necessarily varies according to the stage of the disease or according to the advance the disease has made. If we get hold of a case very early, the extension with weight and pulley and bed rest will do good service for about a month; after that I resort to either the plaster of paris or my modification of Thomas', preferably the latter. If there are already contractures, ankylosis, the question arises, Shall we correct the deformity gradually by extension in the line of deformity, or correct it forcibly at once? Should the symptoms be acute I would avoid forcible correction and make extension in bed until such acute symptoms have disappeared. In the absence of acute symptoms I resort at once to correction under an anesthetic, divide contracted tissues, and apply a plaster of paris dressing. After this proceeding, the patient will always be quite tender, sometimes in considerable distress. He must remain in bed until all pain has been relieved, no matter how long it takes. It is the recumbent position which will soon overcome the muscular spasms—there is no apparatus which will accomplish this as well. If free from pain, the patient may get up with a raised shoe on the good leg and move about with crutches. The plaster cast may remain on from six to eight weeks, when I change it for a modification of the Thomas splint, preferring the simplest kind such as I show you here, and which also requires the crutches. I may use the crutches to the very end of the treatment, or I may, after six months or a year, employ the Phelps' ring with the Thomas, and allow the patient to ride upon it. This requires an elongation of the splint so that it acts as a stilt. I have also used the Lorenz spica with the stilt with good success; these appliances secure rest, prevent pressure and relieve the joint of the body weight.

With these methods I have treated, during the last two years, seven cases, three of which were sup-

purating and required cleaning out, but in none of them have I made any excision of the joint. In one case I broke the neck of the femur, but I can say that every one of them has been and is doing well. As to the function, this is, in all cases, considerably interfered with. Ankylosis is, as far as I know, the rule, and I can never forget the remark of Lorenz to me that ankylosis itself is a great safeguard after recovery from tubercular conditions. My cases are all straight.

In spite of the best possible treatment with mechanical apparatus, there are cases which will not get well and which run a course toward complete destruction of the joint; such cases require bone operative treatment.

STATISTICS, ETIOLOGY AND PATHOLOGY.

By E. H. WILEY, M. D., Los Angeles.

The subject under discussion labors under a variety of synonyms which are uselessly redundant and confusing. Thus we have morbus coxarius, morbus coxæ, hip disease, tuberculous disease of the hip, chronic articular osteitis of the hip, medulloarthritis, coxitis, coxalgia, and morbo coxario. The term, Hip Joint Disease, while not scientifically descriptive, is so well known and so commonly used that its application to the condition will not be easily supplanted. As a matter of fact, all these terms are used to cover a variety of conditions of tuberculosis, some of which do not even affect the joint, or affect it only secondarily.

We should naturally expect that tuberculous disease would most frequently attack the large joints most subject to use and most exposed to trauma. On account of the more sluggish circulation in dependent parts we should expect that the lower extremity would be most frequently the seat of the disease. Statistics bear out these premises, although they do not agree as to the relative frequency with which various joints are attacked. Thus, Young, compiling 1,000 cases, finds the vertebræ affected in 11.6 per cent, the hip in 42.1 per cent, and the knee in 10.3 per cent, while Waldvogel, compiling statistics of Prof. Koenig's cases between the years 1876 and 1895, finds the hip involved 568 and the knee 720 times. The preponderance of tuberculous infection of the knee seems theoretically more probable, considering the large size of the joint, its superficial situation and exposure to trauma, and its burden of weight with relatively poor static properties.

Most authorities agree that the right side is affected slightly more frequently than the left, the difference amounting to 1 per cent in Koenig's series, and slightly more according to some others. The difference may be accounted for by the greater frequency with which the right side is used and its slightly greater liability to sustain injuries.

The consideration of the etiology involves as an exciting cause the bacillus tuberculosis and various predisposing factors which deserve consideration.

Age—Hip Joint Disease is essentially one of childhood, though no age is exempt. By far the greatest number of cases occur before the age of 15 years. In Koenig's series 78 per cent occurred before this age. Of 5,461 cases noted by Knight, 88.2 per cent were under 14, and of 1,344 cases of Wright, Bryant and Sayre, 1,000 were under 15. This susceptibility during early years is due to the activity of joint growth, the liability of the joint to trauma, and to the large number of children within this age limit who are exposed to bad hygienic surroundings.

Sex—There is a slightly greater number of males affected, probably because the rougher habits of boys expose them to injury which is so often the determining factor in the localization of the disease.

Heredity—There can be no doubt that a tuberculous ancestry very strongly predisposes to hip disease. Of 229 cases of Koenig's in which a history was obtainable 35.4 per cent gave a tuberculous genesis. The real percentage is probably higher than is usually obtained, on account either of ignorance or of a disinclination to admit a family taint.

Traumatism—The principal factors in determining hip infection are those which lower the local power of resistance. Falls upon the trochanter or upon the feet, twists and wrenching injuries which impair the integrity of the joint very often precede the development of hip disease. It is interesting to note that it more often follows slight injuries than severe ones which fracture the bone or dislocate the joint. Statistics also note the fact that the process is not infrequently aggravated by traumatism.

Exanthematous diseases, which lower bodily resistance and which sometimes show a disposition toward localization in joints, are frequently followed by tuberculosis of the hip.

Pathogenesis—The hip joint well protected by soft tissues and not liable to open wounds, can only be attacked by tubercular infection in one of two ways: First, and most frequent, by way of the circulation, the local conditions being favorable for the development of the bacilli in or around the joint. Second, the extension of the process to the joint from infections of neighboring structures. It is also true that hip disease is usually secondary to a tuberculous focus elsewhere in the body. The commonest avenues of entrance are through the respiratory and intestinal tracts. In the first instance, enlarged and caseating cervical or bronchial glands usually result; in the second, strumous adenitis of the mesenteric or retroperitioneal groups. Other avenues of entrance, as the ear, are more rarely observed. Not infrequently the tuberculous primary area remains quiescent, or is only demonstrated post mortem.

Bearing in mind the fact that the blood is the carrier of the bacilli to the joint and its neighborhood, we can readily see that the localization of the process is determined by the vascular twig through which the bacillary embolus is propelled. Its entrance into the ramifications of the nutrient artery of the femur will be followed by the wedge-shaped bone infract with which we are familiar. On the